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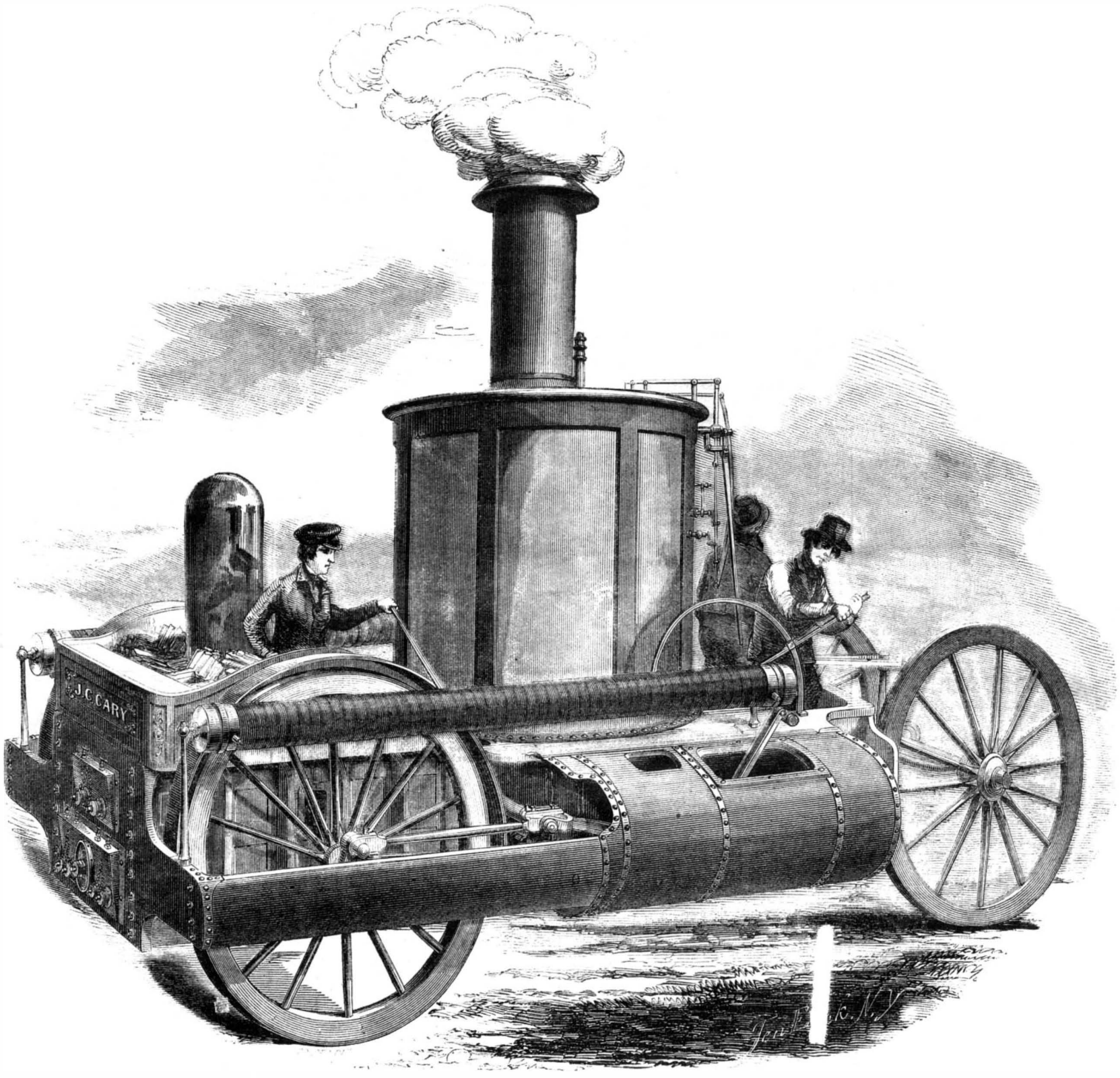
LEE & LARNED'S SELF-PROPELLING STEAM FIRE-ENGINE.



We present herewith a series of illustrations of the new self-propelling steam fire-eugine, "J. C. CARY," built at the Novelty Iron Works, by Messrs. Lee & Larned, under a contract with the city of New York. This engine was brought out for its first public trial at the Bowling Green on the 5th inst., and again in the Park on Thanksgiving Day, the 18th inst., and its remarkable performance on both occasions has attracted to it an unusual degree of public attention.

It is essentially a street locomotive, capable of propelling itself over any ordinary road or street, carrying with it a powerful pump, so arranged as to be driven by the same engines; with the other usual appurtenances of a fire-engine.

In the accompanying views, Fig 1 is the perspective; Fig. 2 a side elevation of the working parts, the outer casings being removed; Fig. 3 a plan; and Fig. 4 a front end elevation.

A is the frame, B the boiler, C the cylinders, D the cross-head, E the connecting rods, taking hold of cranks on the intermediate shaft F; G the static rod, from the cylinders to the journal bearings of F; H the eccentrics and eccentric rods; K the valve rod; L the reversing lever and shaft; M the radius rods; N the parallel rods, taking hold of cranks on the hinder axle, O; P the pump Q the water chamber, with hydrant and suction attachments, connected with the pump by a pipe, r; R the discharge pipe and air chamber; S the main carrying springs, s the forward springs, projecting from the frame at the front end, and taking hold of the upright spindle, T; U is the front axle, which turns freely in the sleeve-bar, V, both passing through an opening or enlargement in the spindle, T, forming in connection with it a kind of universal joint.

The power is derived from one of Lee & Larned's annular steam boilers, the details of which may furnish a subject for future illustration. It is a peculiar form of the upright tubular boiler, combining in the highest degree lightness, activity, strength and safety. It contains 114 pairs of vertical tubes, arranged annularly, or one within the other; the outer of 2½ inches, and the inner of 1½ inches diameter, the annular space between the two being occupied by water. The furnace is composed of 1½ inch tubes set close together, and opening into a steam-drum above, and a ring-shaped water-bottom below. Its hight, from grate to steam-drum, is 4½ feet. Hight of steam-drum, 18 inches; its diameter, 51 inches. Total hight of boiler, 6 feet 3 inches.

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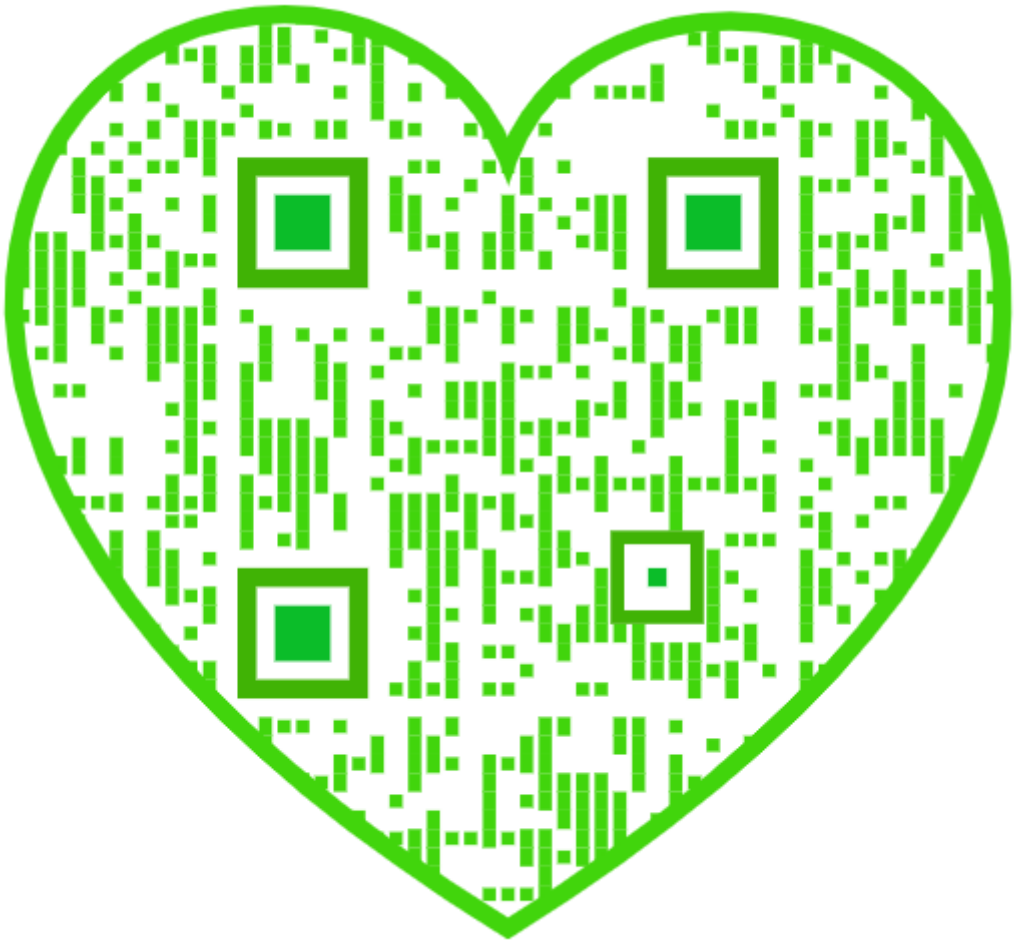

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*** Circulars giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

WASHBOARDS—John Adams, of Pittsburg, Pa.: I claim as a new article of manufacture, a washboard having its rubber, B, composed of glass, as and for the purposes shown and described.

[The rubber of this washboard is constructed of glass, and fitted in a wooden frame, and so gives a smoother and more durable board than any yet produced.]

BOMB LANCE—A. F. Andrews and J. H. Andrews, of Avon, Conn.: We do not claim encompassing the tube, A, and soft metal bands, d d, to fit into the spiral grooves of the rifle barrel, nor do we claim the expanding breech for preventing windage, for these are old and well-known devices used in various projectiles. Neither do we claim, broadly, the employment or use of a fuse, j, for communicating fire to the charge after a certain interval of time; nor do we claim a part from or irrespective of the fuse, the igniting of the charge by percussive force, for there are many varieties of percussive shells, bombs and the like, in which the charge is directly ignited by percussion; but we are not aware that a fuse has ever been used in connection with parts so as to be ignited by percussion, and thereby obviate the described difficulty attending the direct ignition of the same by the firing of the powder which projects the missile.

We claim the employment of the independent movable fuse tube, D, arranged within a bomb lance, substantially as shown and described, so that the fuse will be ignited by the motion of the missile.

[For more information regarding this invention, see another column.]

KNIFE SHARPENER—Alexander Annan, of New York City: I do not claim the employment or use of corrugated steel plate, C, for cutters, for such have been previously used for knife and scissors sharpeners.

But I claim the two cutter plates, C C, with cut or corrugated surfaces, placed in oblique positions relative with each other, and arranged or fitted between the upright plates, B B, of a base, A, substantially as and for the purpose set forth.

[This invention consists in having two cutters formed of rectangular steel plates, cut or corrugated on their sides similar to files, and fitted in oblique grooves in a metallic frame; the cutters being placed in such position that they retain each other in the frame, and are rendered capable of being adjusted in varying positions in the plane of their movement, so that the whole surface of the plates may be used as cutting surfaces.]

INFANTS' CRADLE—Thomas C. Ball, of Keene, N. H.: I claim the arrangement of the cranks, C C, pieces, D D, slot, E, and cross-bar, F, in combination with the spring and gearing operating in the manner explained for the purposes specified.

SAFE LOCK—Obadiah Bayly, Jr., of Dearborn County, Ind.: I claim the action of niche wheel, N N, in preventing the bolt, B B, from being passed back so as to unlock. The application of a movable pinion on the shaft wheel, W W, in connection with a steel plate and hand, by means of which the lock is set to unlock at any given hour by the niche passing in front of the bolt, B B, and permitting it to pass within the niche and not until then.

Also, The application of security spring, H, security lever, F F, and security catch, I, in allowing bolt, B B, to pass back and over the rim of niche wheel, N N, and again securing it opposite the rim of niche wheel, N N, when the door is shut.

Also, The application of stop levers, S S, and Q Q, in stopping the clock, when the niche is opposite bolt, B B, by lever, S S, coming in contact with the cogs of wheel, U U, of the clock.

Also, The application of spring, L, in pressing bolt, B B, against the plate of the works.

LATH MACHINE—Josiah Black, of Memphis, Tenn.: I claim the vibrating table and lever, B, together with mechanism connected therewith for giving change of motion to carriage, in combination with the lever, B', and the mechanism for opening and closing the dogs, the whole being arranged for joint operation, substantially as and for the purpose set forth.

BEE HIVES—Asa Blood, Sr., of Norfolk, Va.: I claim the main or breeding core, B, in enclosing case, C, in combination with the honey cores, D, in cap, E, the several parts being constructed and arranged in the manner and for the purposes specified.

MACHINE FOR MAKING SPOONS—J. P. Brinkerhoff, of Brooklyn, N. Y.: I am aware that drop dies have been used for cutting out articles from metal plate and swaging them in proper form at one operation. I therefore do not claim, broadly, such operation

But I claim the arrangement and combination of the rolling die, E, die, G, bolster, F, opening, h, and bar, H, as and for the purposes shown and described.

[In this invention a roiling and rectilinearily moving die is employed, combined and arranged so as to perform the desired work—the manufacture of metal spoons, forks, knifes, &c.—in a very expeditious and perfect manner, and requiring but little manipulation for completion.]

ELECTRO-MAGNETIC FIRE ALARM APPARATUS—Moses G. Farmer, of Salem, Mass.: I claim, first, The dial, the snail and the key or lifting piece, A 2, in combination with an electric circuit and with the means of making and braking the circuit, for the purpose of striking a definite number of blows upon one or more bells, and of repeating the same, and of registering or indicating the number of the blows so struck as described.

Second, The arrangement of the circuit lever, l, the lifting piece, A 2, and pin, i 2, so that the circuit shall be closed on the dropping of the lifting piece from off the pin as set forth.

Third, The arrangement of the circuit lever, e, rack W, operating in the manner set forth, whereby the circuit is completed by the falling of the rack, and broken when the required number of blows has been struck, as set forth.

Fourth, The combination of the circuit levers, l and e, operating in the manner substantially as set forth for the purpose described.

Fifth, I claim the arrangement of the arm, f, the arms, a and b, or their equivalents, for the purpose of effecting electric communication alternately with the time magnet, D, and the operating magnet, H, essentially as described.

SHOE PEG MACHINE—Azro Brown, of West Waterford, Vt.: I claim, first, The combination and arrangement of the radial slotted plate, f, eccentric helical or spiral edged plate, between which and the lower plate, e, it is confined; said lower plate, e, having depressions and gutters, in its upper surface for receiving corresponding parts formed on the lower surface of the slotted plate, f, and a raised or ridged portion nearer its center, whose inner edge corresponds with the eccentric curvature of the edge of the plate, the said slotted plate, f, and the other parts mentioned being arranged and operated substantially in the manner and for the purpose set forth.

Second, I claim giving an intermittent progressive motion to the slotted plate, f, by the combination of the ratchet notches on its under surface spring pawl, K, and oscillating lever, l, attached by a connecting rod, m, to the pitman rod, as described.

Third, I also claim forcing or conveying the strips of wood from which the pegs are formed after being cut from the block or bolt, by means of the combination and arrangement of the traversing bars, V' V', guided by wheels on the end of the cross-head, at the angle where they are connected, curved groove, V, in the drum, P, and knives, W, between which the strip is first deposited and subsequently conveyed through the slot in the rim of the plate or rim, e, and under the V-shaped cutter, V, substantially as set forth.

Fourth, I claim the combination of the cylindrical knife, H, and cutters, J, as described.

[For more information about this invention see another page.]

DEVICES FOR SAVING THE SEED FROM HAY FED TO STOCK—R. A. Campbell, of Salem, Ind.: I claim the combination of the inclined conducting passage, F, intermediate hayrack, E, and sieve bottom trough, B C C, substantially as and for the purposes set forth.

MODE OF CONNECTING ELECTRO-MAGNETIC APPARATUS WITH TOOTH FORCEPS—J. J. Clark, of Philadelphia, Pa.: I do not desire to claim the combination of electro-magnetic machine and forceps, as that has been invented by Francis.

But I claim the employment of the foot key, K, or its equivalent, in combination with the electro-magnetic machine and forceps, arranged and operating substantially as described.

BILLIARD TABLE—H. W. Collender, of New York City: I am aware that strips of steel have been used in cushions for billiard tables, but in such cases the strips have been secured above the bed of the table to cushion blocks or frames of the usual construction, and therefore I do not wish to be understood as making claim, broadly, to the use of strips of steel for the cushions of billiard tables.

What I claim is the manner substantially as described of applying steel springs as cushions to billiard tables by clamping the lower portion thereof to the edge of the bed, as set forth.

And I also claim making the hight of the cushions above the bed of the table, adjustable substantially as described, that they may be adapted to balls of different diameter, as set forth.

And I also claim combining with the bed and cushions applied substantially as described, a flanch or ledge outside of the cushions on a level with the bed, or nearly so, substantially as described to form a rest for the hand when playing with the ball near to the cushion, as set forth.

POWER LOOMS—John Crawshaw, of Rochester, N.Y.: I do not claim operating the take-up motion by means of a pawl attached to a lever operated upon by a stud or roller attached to the lay; nor do I claim reducing the friction on the yarn beam, as the quantity of yarn upon it is reduced by the use of weights traveling along levers connected with the friction straps.

But I claim, first, The lever, i j k, applied in combination with the cloth roll and with the spring, h, of the take-up lever, to operate substantially as described for the purpose set forth.

Second, The rock beam, I, its arms, u, and pawl, v, applied in combination with the ratchet wheel, t, screw, r, and lever or levers, q q, and weight or weights, s, substantially as described to move said weights toward the fulcra of the friction strap lever, p p, as the quantity of yarn on the yarn beam is reduced.

[A notice of this improvement is given in another column.]

SEALING PRESERVE JARS—R. M. Dalbey, of Mount Washington, Ohio: I claim the yoke or ring, in combination with the leather or its equivalent, as applied to vessels substantially as described, for the uses and purposes set forth.

BURNING COAL DUST—G. B. Deppen and E. Devengood, of Myerstown, Pa.: We claim, in combination with a fan-blower to promote combustion, the arrangement of the fire chamber, ashbox, perforated plates, combustion and exit chambers, communicating with each other, and with the air trunk leading from the fan-blower, substantially in the manner and for the purposes described.

SAFE LOCK—Leger Diss, of Utica, N. Y.: I do not claim the several parts of my lock, separately considered.

But I claim the combination of the reciprocating stop holder with the levers, h, stops, a, and the compound slotted tumbler, D, the construction and operation being as described.

VAULT LIGHT—Cornelius Donaldson, of New York City: I do not claim a vault light formed of several glasses set in a frame, as one or more glasses have heretofore been used, neither do I claim a double vault cover or roof with perforations in the lower plate or a pipe connected with the space thus formed, as the same is believed to be the invention of another party.

But I claim the annular flange, 4, on each glass, d, in combination with the supporting plates, b and c, and the ring packings of rubber, or equivalent material, in substantially the manner specified.

VEGETABLE CUTTER AND COFFEE MILL COMBINED—B. Essig, of Pittsburg, Pa.: I do not claim in this any parts or devices of the cutting apparatus, such as the adjustment of the knife, or the attachment of the cutter disk to its seat, or any parts of the coffee mill considered by themselves.

But I claim the mode of arranging and combining a vegetable cutter and a coffee mill, in such a manner ner that by means of the sliding shaft, B, either of the two may be set in or out of gear, substantially as set forth.

STRAW CUTTERS—Wilson Green and Malcom Mc. Fisher, of Chattanooga, Tenn.: We claim the arrangement of the treadle, A, leather strap, D, the regulating board, G, and knife, B, combined with the double-leafed lever, C, lever, E, and upright standard, F, for joint operation, as set forth and described.

HAND HAMMERS—Alfred Gregory, of Washington, D. C.: I claim the heft regulating "hammer shaft," or helve, substantially as specified and operating to secure to the implement, of which it forms the handle, an enlarged and variable capacity to deal light or heavy blows as required, essentially as set forth.

ASTRONOMICAL INSTRUMENT—Henry Glover, of New York City: I claim, first, The use of the double reflectors or mirrors, G G, in combination with a vertical sight, whether the said mirrors are fixed or made adjustable, substantially as set forth.

Second, I claim the second graduated arc, E, in combination with the main instrument, A, and with the second mirror, G', in the manner and for the purposes set forth.

Third, I claim the supplemental arc, I, in combination with the level, J; and with the main instrument, A, in the manner and for the purpose set forth.

CENTER BOARDS FOR VESSELS—Jesse F. Potts, of Apalachicola, Fla.: I claim the two or more hinges or parallel bars, D and D, as described, when arranged in the manner and for the purposes set forth.

BINDING ATTACHMENT TO HARVESTERS—Wm. Grey, of Nicholsville, Ohio: I claim, first, The arrangement of gravitating platform, F, 19, and series of levers, G H I J, with their accessories, in the described connection with a drive wheel for the automatic starting of the binding mechanism by the weight of the sheaf or gavel, substantially as set forth.

Second, In this connection the talons, 16, 17, 18, 16', 17' 18' constructed and operating substantially as set forth.

Third, In combination with the talons, or their equivalents, the crane, I I I, and its accessories, having the described compound movement, substantially as and for the purpose set forth.

Fourth, In the described combination with the talons, or their equivalent, the pliers, I I, constructed and operating substantially as set forth.

Fifth, The rod, c, "looper," s, and "tucker-in", t, constructed, operated and operating together, substantially as set forth.

AUTOMATIC FEED-BOXES FOR ANIMALS—Albert Goodyear, 2d, of Hamden, Conn.: I claim the arrangement of the box, B, lid, L, spring, l, and catch, a, with sliding plate, K, dial, D, notch, n, and button, E, united together substantially in the manner and for the purpose set forth.

HARVESTERS—Stephen Hull, of Poughkeepsie, N.Y.: I do not claim connecting the finger bar to the machine by a hinge joint, nor do I claim connecting the finger bar to the machine by the double rule joint, nor with the double jointed coupling.

But I claim connecting the inside shoe, b, to which the finger bar is fastened, directly to the main frame, or to one or both the end bars of the main frame by means of circular bearings at each end of the shoe, without any coupling piece, in combination with a small wheel hinged to the inside shoe, substantially as represented and for the purposes set forth.

Second, I claim the notches, holes or slots in the shoe and flanges near the bearings or joints on which the shoe turns in connection with the movable catches or bolts that work in them to keep the finger bar in its proper place or from rising or falling too much over uneven ground, in combination with a jointed shoe constructed substantially as represented and for the purposes set forth.

Third, I do not claim simply attaching a wheel of any kind to the inside shoe; but I claim the arrangement of the small wheel, b, with the jointed frame or bar, i, hinged to the inside shoe, by which the wheel is allowed to the inside shoe, by which the wheel is allowed to remain in the same position when the finger bar is turned up to go from place to place, as it is when the machine is cutting grass and the finger bar rising and falling over uneven ground.

ANIMAL TRAPS—C. Jillson, of Worcester, Mass.: I am aware that rat traps have been made where the jaws have been sprung toward each other, and that a single jaw has been made to move in the arc of a circle; these I do not claim.

But I claim a rat or animal trap in which the jaws are moved from each other in a plane, and thus enlarge the opening between them, and which, when tripped, shall close up or contract the said opening, substantially as described and represented, and for the purpose set forth.

HORSE POWER DRAUGHT—J. Herva Jones, of Rockton, Ill.: I claim the combination of the levers, B B B B, and the flexible link, D D D D, in the manner and for the purpose set forth.

BREAST PIPES—Thomas Lewis, of Malden, Mass.: I claim the described combined nipple shell and breast pipe, constructed by the attachment of a neck and pipe to an ordinary nipple shell, as set forth, for the purpose described.

METHOD OF REGISTERING THE SPEED OF RAILROAD TRAINS—Charles T. Liernur, of Mobile, Ala.: First, I claim in the indicating apparatus, the governor, A B C D E, placed in the lower part of a casing, which can be used as a car seat, said governor having its weights so united by connecting rods and levers as to cause them to remain in their centrifugal and centripetal action, uninfluenced by any horizontal jars and shocks of the car.

Second, I claim the compensation beam, K, or its equivalent, with its rods and levers, to bring over the motion of the cross head of the governor to the indicator, so arranged as to cause the vertical jolts and jars received by the various moving parts to absorb one another, and the indicator, X, which points out the degrees of speed on the index, W, the whole so arranged as to enable passengers and conductors to be constantly informed of the exact speed of the train, as substantially described.

Third, In the registering apparatus, I claim the circular register of metallic or other paper with its radiating and circular lines expressive of distance and speed, said register receiving any degree of retarded motion from the car axle by means of the worms, B1 and B2, and the worm wheels, C' and D', and the pencil holder, Z, with its adjustable pencil, substantially as described above, the whole so arranged that the various degrees of speed on all parts of the road shall be noted down on the circular register.

TELEGRAPHIC INSTRUMENT—Rufus Kendrick and Alpheus W. Arkerson, of Cambridgeport, Mass.: We claim the application to the finger key of a telegraph instrument, of a rocking shaft, or its equivalent, to which a succession of vibratory motions of the proper proportionate durations for producing the characters required is communicated, as specified.

We also claim the construction and arrangement of the rocking shaft, B, with its dogs, i i i, &c., and of the keys, D D D, &c., operating in combination, substantially as set forth.

MACHINE FOR SAWING AND PLANING SHINGLES—George H. Mallory, of New York City: I am aware that circular saws and rotary planers have been previously used for sawing and planing shingles, and I therefore do not claim, broadly and separately, said devices.

But I claim the particular means employed for adjusting the bolt, J, to the saw, in order to give the taper form to the shingle, in combination with the means employed for adjusting or moving the planer, C, to its work, to wit, the bars, p q, connected as shown, by the pendant, q', and set screws, t t, operated by the wiper, u, and pins, c c, and attached respectively to the bar, I, containing the jaws, n n, which hold the bolt, J, and the bar, v, connected with the planer head, D, the whole being arranged to operate as and for the purpose set forth.

[This is an improvement in that class of shingle machines in which the shingles are sawed from the bolt and planed at one operation. The invention consists in the peculiar arrangement of means employed for presenting the bolt to the saw, so that the shingles may be sawed from the bolt in proper taper form, and also operating a rotary planer so that the same, while at work, may be fed towards the shingle, to compensate for its necessary oblique position while being sawed from the bolt.]

HARVESTERS—James S. Marsh, of Lewisburgh, Pa.: I claim the arrangement of the bent lever, I, and the arm, H, of the caster wheel, when said lever is pivoted behind, and said arm is pivoted before the axle of the driving wheel, and the two are connected by the link, h, substantially as and for the purposes specified.

TONGS FOR COAL, &c.—James M. Meschutt, of New York City: I claim as a new article of manufacture, the metallic tongs for coal fires, &c., constructed with fingers or curved prongs and the projections for the purpose of preventing the fingers coming too closely together, substantially as specified.

HAND DRILLS—Frederick McNair, of Fultonham, Ohio: I am aware that drills have been constructed or formed of a sliding gate, containing the drill arbor, and having a feed screw attached, and I therefore do not claim, broadly and separately, such parts

But I claim the arrangement of the feed screw, F, and sliding gate, D, and frame, C, in combination with the adjustable bed B, as and for the purposes shown and described.

[The object of this invention is to obtain a portable hand drill—one that may be readily manipulated, and capable of being more generally adapted to various kinds of work. The frame of the drill on or in which the sliding gate works is attached to a movable or adjustable bed, which is hinged or jointed to a permanent or stationary bed, so that the drill may be used either in a vertical or horizontal position, as the nature of the work may require.]

WASHBOARD—John Miner and Silas Merrick, of New Brighton, Pa.: We are aware that it is not new to strike up in a mold or die the metal plate of a washboard, to make raised and depressed figures in general, or even the rib work described; nor yet to make a metallic crimped plate without a support or brace in the back side thereof.

But we contend that it is new to stiffen a crimped metallic plate of a washboard, by confining the crimped portion within the frame, so that the plane border only shall be received into the narrow groove of the frame, provided the corrugations or ribs be so formed as to project equally on both sides of the medial line of the plate, so that each side of the plate shall be equally braced by the crimping of the metal, and consequently be equally adapted to washing on both sides.

We disclaim the general device of making a crimped metal washboard with a plane border received into a plane groove in a frame.

But we claim so impressing the corrugations equally upon both sides of the plate that the medial or central line of the corrugated part of the plate may be in a line with the plane border, c c, and that the ribs shall project equally on both sides, forming two equally good washing surfaces, as set forth.

MELODEONS, &c.—Isaac Rehn, of Philadelphia, Pa: I claim, first, The employment of independent wind chests in melodeons, harmoniums, and other similar reed instruments, in combination with the suction bellows, for the purpose specified.

Second, The introduction of the stop valves between the independent wind chests and the bellows, in combination with the appliances described, or their equivalents, for operating the said valves, when the said appliances are situated within the bellows, as set forth.

CHURN—Harry Robie and Royal V. Robie, of Eaton, N. Y.: We are well aware that the beaters placed spirally around a horizontal shaft is an old and well-known device. We do not claim, therefore, any of the parts separately or in the abstract, irrespective of the arrangement as shown and described.

But we claim the perforated beater, B, in combination with the alternate beater, C, presenting a concave extremity in connection with the passage formed by the narrow base of the beaters, the several parts being constructed and arranged upon the shaft, A, with respect to each other, in the manner and for the purposes set forth.

MOLD FOR GLASS BOTTLES—Samuel S. Shinn, of Lancaster, N. Y.: I claim the mold constructed with its stationary portion, A, of clay, plaster, or material of similar character, clamped between plates, B C, and the opening portions, E E, of metal, hinged to the upper clamping plate, C, substantially as and for the purpose set forth.

[The molds in which bottles are blown, are, in this invention, constructed partly of clay, plaster of Paris, or other of the earthy matters usually employed for such purpose, and partly of metal, whereby the advantages of the two materials are combined in such a manner as to make a mold superior to one made entirely of either material like the molds commonly used.]

FORGE HAMMER—Benjamin Shiverick, of Pittsburg, Pa.: I claim the cam, F, so constructed as to act on the collar, K, opposite the spindle, or nearly opposite the spindle, during the whole time of its action in raising the hammer, except when the extreme end of the cam is passing out from under the collar to let the hammer drop, as described.

I claim a wedge, or its equivalent, so constructed and arranged as to be moved by the workman or attendant while the hammer is in motion, to graduate the action of the springs upon the hammer, to make it strike light or heavy blows, as desired.

CHURN—Charles W. Stafford, of Burlington, Iowa: I am aware that many of the contrivances described have in some shape been substantially used for a like purpose before. I do not, therefore, claim them separately, except as stated.

But I claim the general arrangement and adaptation of parts, substantially as set forth by which a cheap, light, convenient, and effective churn is produced.

BREECH-LOADING FIREARMS—John C. Symmes, of Watertown Arsenal, Mass.: I claim the elastic flexible lip, substantially as described, however it may be applied to checking the escape of gas from the breech of breech-loading guns.

MACHINE FOR MOLDING BOOT AND SHOE SOLES—Daniel J. Tapley, of Danvers Center, Mass.: I do not claim pressing soles between a concave and convex former, in order to shape them to the last, as that is old.

Nor do I claim any one particular part of the machine, independently of its combination.

But I claim, first, Providing substantially as described the lower former, B, with a socket C, to receive the upper end of the wooden standard, D, and also with projecting ears, b b, to guide the rods, F F, and holes, c c, in the back flange, to admit screws for confining the machine to a bench, or the side of a shop.

Second, The combination of the spring, H, lever, G, and connecting guide rods, F F, with the upper former, A, substantially as set forth, and for the object specified.

HAME FASTENER—John Tingley, of Potter co., Pa.: I do not claim, broadly, a metallic hame fastener, for I know there has been at least one patent granted for a metallic fastener.

I claim the combination of two hooks coupled together by a semi-revolving force plate, and the spring, D, Fig. 4, the catch, B, and the projection, C, when made and combined substantially as set forth, and for the purpose described.

SHIPBUILDING—Daniel Vrooman, of Hudson, Ohio: I claim the arrangement and combination of the inclined surfaces or projections, B D, and the elastic fins or wings, A, with the hull of the vessel, substantially as and for the purposes shown and described.

[A notice of this improvement is given in another column.]

LOCOMOTIVE LAMP CASE—Irvin A. Williams, of Utica, N. Y.: I claim the combination of casings, B and C, with the chimney, A, as described, the plates, p and p', alternating, and the construction and arrangement of the several parts, substantially as set forth.

INSTRUMENT FOR TRIMMING THE EDGES OF BOOT AND SHOE SOLES—Isaac Rich, (assignor to Samuel C. Arnold), of Manchester, Conn.: I claim the described instrument for trimming the soles of boots and shoes, consisting of the handle, A, guard, B, knife, C, and sliding gage, D.

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SPRING BED BOTTOM—Noah Warlick, of Chamber's Court House, Ala. : I am aware that wooden slats have been used with spiral springs, and therefore do not claim, broadly and irrespective of arrangement, such device.

But I claim the wooden springs, D, attached to the under side of the longitudinal slats, B, and resting on the transverse bar, E.

I also claim the use of metal or india rubber springs resting upon said transverse bar, for the purpose specified.

[This invention consists in having the bed bottom formed of a series of longitudinal wooden strips or slats, having their lower ends, or the ends at the foot of the bedstead, permanently attached at equal distances apart, to a transverse bar, the slats at about their centers being attached to springs which rest on a transverse bar attached permanently to the bedstead, and the upper ends of the slats attached to a strap which serves as a stay, the whole being arranged so that a very elastic, simple, and cheap bed bottom is obtained.]

BRAIDING MACHINES—Andrew B. Clemons, of Derby, Conn., (assignor to the Birmingham Iron Foundry, of Birmingham, Conn.): I claim combining and arranging the tension and pall blocks or weights, H K, which have a rising and falling movement over the vertical guide bar, E, in relation to the lower eye, F, in the bar, E, and the bobbins, D, described, for regulating the paying out of the thread from the bobbin, and consequently its tension in the manner set forth.

[The weight which assists in regulating the tension of the thread is so formed as to enable it to have an up-and-down movement beside the vertical guide bar, and the guide bar is surrounded above the weight by a metallic block having a flanch at its side that projects over the ratchet teeth or notches formed on the top of the bobbin. The thread is passed through an eye in the upright guide bar near the bottom, thence under the lower end of the weight and thence through an eye at the upper end of the guide bar to the object to be braided. By this means the diameter of the winding portion of the bobbin may be greatly reduced, and the bobbin made to hold much more thread, and turned with much less friction than if the tension weight were arranged within a box at its center, as in the ordinary method.]

MACHINE FOR CUTTING BUNGS—James Lyon and George H. Brady, (assignors to themselves and Thomas J. Falls, Jr.,) of New York City : We claim the cutters, d d, and stocks, c c, sliding in the adjustable blocks, b b, that are revolved by the face place, F, and which cutters, d d, are projected by means of the disk, F, and act to cut a tapering bung, substantially as specified.

RAILS FOR RAILROADS—John Cochrane, of New York City : In the manufacture of wrought iron rails or bars for railroad tracks, I claim the making or forming of such rails by means of rolls, with additional metal upon the crown or head thereof, which additional metal is forced into the head or top part of the rail by a second process, thereby consolidating the head or top part of the rail, and hardening the bearing surface thereof, substantially as described.

RE-ISSUES.

SEED PLANTERS—Jarvis Case, of Bloomington, Ill. Patented January 16, 1855 : I claim, in combination with a corn-planting machine that is constantly moved over the ground and drops the grain intermittently, the so combining of two slides, one of which is at or near the seed hopper, and the other at or near the ground, or their equivalents, with a lever, as that the operator or attendant on the machine can open said slides at the proper time to deposit the seed, and prepare a new charge by the double dropping specified.

PRINTING PRESS—George P. Gordon, of New York City. Patented June 13, 1854 : I claim relieving the sheet from the type, and taking the sheet directly from the platen, or either of them, with or by the same nippers which shall carry such sheet to its place of deposit or piling.

I also claim giving, with one inking cylinder, two distributions to the inking rollers for each impression, viz., one distribution prior to passing the form, and one distribution prior to the return of the form to its first position.

I also claim the arrangement of the spring, connecting rod, crank, and stops, as described, to operate the bed and give the necessary dwell for the impression.

GRINDING MILLS—Edward Harrison, of New Haven, Conn. Patented June 6, 1854 : I claim the improved method described of securing the runner stone on the driving spindle in a grinding mill by means of a metallic band, or its equivalent, embracing the periphery of the stone, by combining said band with a hub, and a back plate of at least as great diameter as the runner, and rigidly attached to the spindle, such combination operating to secure the stone firmly in its place, in the manner and on the principle substantially as specified.

DESIGNS.

HAT AND CANE STAND—Edward Reynolds, (assignor to Thomas W. Brown), of Boston, Mass.

COOK'S STOVE—A. C. Barstow, of Providence, R. I.

SCRIPT TYPE—James Conner, of New York City.

ADDITIONAL IMPROVEMENT.

PROPELLER—Henry Link, of Little Falls, N. Y. : I claim the wings made up of a series of horizontal hinged valves graduated in width as described, in combination with the cylindrical section, either hollow or solid, substantially as and for the purpose set forth.

DISCLAIMER.

VESSELS FOR HOLDING LIQUIDS—James H. Stimpson, executor of James Stimpson. Patented October 17, 1853 : I disclaim so much of the first claim of said patent as may include the application of the double wall to other structures or vessels than ice pitchers.

INVENTIONS EXAMINED at the Patent Office, and advice given as to the patentability of inventions, before the expense of an application is incurred. This service is carefully performed by Editors of this Journal, through their Branch Office at Washington, for the small fee of $5. A sketch and description of the invention only are wanted to enable them to make the examination. Address MUNN & COMPANY,

No. 128 Fulton street, New York.

New Gelatinous Material.

It is announced in foreign papers that Professor Schetzer, of Zurich, in Switzerland, has discovered that a strong solution of the sulphate of copper into which an excess of ammonia has been poured, will dissolve cotton and convert it into a sort of gelatinous substance something like collodion.

A Cure for Scrofula.

The Cincinnati *Commercial* publishes the following communication from Nicholas Longworth, the great wine manufacturer of that city :—

"All the papers I had, giving the cure for scrofula, have been distributed to persons sending for the remedy. I have never heard of a case where it did not effect a speedy cure, and it can in no case do an injury. In several instances where it has been applied to old sores, it has also speedily effected perfect cures. Put one ounce of aquafortis in a bowl or saucer; drop in it two copper cents—it will effervesce—leave the cents in; when the effervescence ceases, add two ounces of strong vinegar. The fluid will be a dark green color. It should and will smart. If too severe, put in a little rain water. Apply it to the sore, morning and evening, by a soft brush or rag. Before applying it, wash the sore with water. Its first application known to me was a poor girl, sent to our city from Memphis, to have her leg cut off, as it was feared she might not live long enough to have it cut off in that hot climate. She was refused admittance to the poorhouse, and was lying on the sidewalk, as she could not even stand up. From her knee to her foot one-third of the flesh was gone, and all the skin, except a strip about two inches wide. She was laid on a bed, and the remedy placed on a chair by it. She could rise up and apply it. In a few days her peace of mind returned, and she declared her leg was getting well. It was supposed it was a relief from the pain only; but when examined, fresh flesh was found growing, and skin over it. She was soon running about, and would work, which delayed the entire cure, leaving a small sore, which was, in a few months, entirely healed. A young girl with scrofula in her neck, leaving a large open hole, and deemed incurable, come one month after entirely cured, and recently married, with her husband, on their way to the east. I have never known a case where it did not effect a cure."

New Photographic Process.

In a communication to *Cosmos*, Professor M. Godefrey, of France, described the following method of obtaining photographs :—

Float a sheet of paper upon a bath composed of two ounces of nitrate of uranium and 120 grains nitrate of silver dissolved in three and a half ounces of water. The paper is permitted to remain thus situated for three minutes, and is afterwards dried in a dark place, and kept ready for operation. To take a picture, a sheet of paper thus prepared is placed in the camera in the usual manner; or if a copy from an engraving or another picture is to be taken, it is placed under the object to be copied, and exposed to the light. After this, it is immersed in a bath made up of 40 grains proto-sulphate of iron, 20 of tartaric acid, and a trace of sulphuric to every ounce of water. This bath rapidly develops the impression, and the paper is taken and simply washed in rain water which fixes it.

The sensibility of the paper increases with the quantity of the nitrate of uranium which may be employed. Paper thus prepared is very sensitive, and Professor Godefrey thinks it will yet supersede all other kinds now used in photography. By placing a sheet of it between the leaves of a book, and closing it for three hours, a copy of the printed matter will be obtained by immersing the paper in the developing bath, as has been described for taking other impressions.

It is a remarkable fact—and a recent discovery—that objects exposed to light for a certain period absorb or retain a portion of the luminous agency. This action is illustrated in obtaining a copy of a printed book in the manner described,

ACKNOWLEDGMENT.—We have to thank the Rev. Dr. J. Constantine Adamson for the Annual Report of the Council and Officers of the American Geographical and Statistical Society, for 1857.

Enameling Iron.

A very simple method of coating iron with an enamel of glass is a desideratum. The following process, we are assured, is effective for securing this object, and is the cheapest and most simple which has yet been brought under our notice. The iron articles are first thoroughly scoured with sand and dilute acid, then washed and dried. Their surfaces are now covered with a thin coat of gum-arabic laid on with a brush, and over this the enamel powder is sifted, until all the surface is covered to a certain depth, according to the thickness of glaze desired. The articles are now put into an oven heated to 212°, and completely dried, after this they are put into a furnace, and raised to a red heat which melts the powder and it forms the glazed surface. They are now removed to a close chamber when they are allowed to cool slowly, and are then annealed.

The glazing powder for white enamel is composed of 130 parts of powdered flint glass, 20 of carbonate of soda, and 12 of borax. These substances are fused in a crucible and reduced to powder. Some glazes contain oxyd of lead; they are dangerous to employ for culinary vessels, because, if acid is employed in cooking, it is liable to take up a portion of the lead, which is a poison. The enamel powder now described is perfectly safe, and can be applied to any articles of iron.

Machine for making Shoe Pegs.

Shoe pegs, small and insignificant as they appear and may be thought by some, are yet an important manufacture; and when we look at one, and see its excellent shape and perfect finish, we are surprised to learn that by the aid of machinery they are made with such rapidity as to be sold at almost the same price as oats,—per bushel. Azro Brown of West Waterford, Vt., has invented and patented, this week, an improvement in the machine used in their manufacture, which consists, first in cutting from a bolt or block of wood, thin slips, corresponding in size with the length and thickness of the pegs to be formed, and placing them into radial slots in an intermittent rotating plate, arranged between two other plates, or heads, on the faces of which, next each other, are found projections, whose inner edges are made eccentric, helical or spiral with the center. These latter operate upon the outer ends of the slips of wood, above and below the radial slots in the intermittent rotating plate and thereby force the whole series of strips of wood in the slots towards the center, at every motion of the rotating plate, the required distance to enable a peg to be cut from the end of all of them at every depression of a circular revolving knife. The required taper is previously given the pegs by stationary and revolving knives, and the several operations necessary to this end are performed by a simple compact and novel series of parts arranged in a suitable manner. The claim will be seen by referring to another page.

Improvement in Power Looms.

John Crawshaw, of Rochester, N. Y., has produced an improvement in power looms which consists, firstly, in certain means of controlling the take-up motion of a power loom, whereby its operation is rendered perfectly uniform; and secondly, in certain means of governing the let-off motion, whereby the amount of let-off is caused to be always in proportion to the amount of take-up. It was patented this week, and the claim will be found on another page.

Georgia Prosperity.

The Macon (Ga.) *Telegraph* states that there are now 1,200 miles of railroad in that State, all clear of debt, and paying 17 per cent of yearly dividends to the stockholders. The cotton crop of the present year will bring $21,000,000, and factories and machine shops are multiplying with great rapidity.

To make Gold Powder and Liquid.

GOLD POWDER.—Take any quantity of gold leaf and grind it with pure honey by a "muller" till the metal is reduced to an impalpable condition. The mixture of gold and honey is then placed in a china mortar containing water, and thoroughly stirred. The contents are then allowed to settle, when the gold sinks to the bottom, while the honey being soluble is taken up with the water and may be poured off. By several washings in this manner the honey will be completely separated and the gold left in the condition of a fine powder. By placing leaf gold in a mixture of nitric and muriatic acid in a glass vessel it will dissolve like sugar in water. By adding some copperas to this *aqua regia*, the gold will be separated and fall to the bottom in fine powder. The acid may then be poured off, and the gold powder washed in pure water, and dried. By triturating leaf gold with sulphate of potassa in crystals, then washing out the latter in boiling water, gold in powder is left behind. This powder is employed by artists for gilding, by mixing it with gum water.

GOLD LIQUID.—Into a solution of nitro-muriate of gold pour an equal quantity of ether, then agitate them for half an hour and allow the contents to settle. The supernatant portion is then poured off, and is called "ether gold." Naptha and several of what are called the "essential oils," such as that of lavender, rosemary, &c., possess the same property as ether in taking up gold from its solutions. Ether gold was at one period much used in medicines; but it is now only moderately employed for writing on illuminated parchment, and on polished steel. The ether rapidly evaporates, when this solution is put on paper and the gold remains adhering with considerable tenacity.

GOLD SOLDER.—Take of pure gold 12 parts (by weight), silver 2, copper 4; and fuse them together. This alloy is employed by jewelers for soldering articles of gold.

A Tall Chimney.

A chimney 256 feet in hight has recently been erected at the Charlestown (Mass.) Navy Yard, and it is the tallest smoke-pipe on this continent. There are two chimneys in the old world, however, which have a greater altitude; one of these is in Liverpool, and the other in Glasgow, both of which are over 400 feet in hight. A new one is about to be erected in the latter city, the hight of which is to be 456 feet; it will be the tallest in existence, capable of frowning down with a well-merited conceit upon all its shorter companions. These tall chimneys belong to large chemical works, and their use is principally to carry up the noxious gases far above the adjacent houses, gardens and fields. Prior to their erection, these gases had injured the shrubbery and completely blasted the trees in the neighborhood.

Bomb Lance for Killing Whales.

A. F. and J. H. Andrews, of Hartford, Conn., have invented and patented this week an improved bomb lance for killing whales. A cylindrical tube pointed at its front end, and having two smaller tubes placed one within the other, and fitted within it is used, the smallest tube being provided with a fuse and cup, and arranged so that the missile may be fired from a rifle, and the missile exploded either by the direct concussion of the discharge, or by the concussion produced by the missile entering the whale.

SODA FROM SALT.—M. Schlœsing has sought to obtain soda directly from common salt, by dissolving chloride of sodium in a solution of ammonia with an excess of carbonic acid under pressure, a reciprocal change occurs with the formation of bicarbonate of soda and chloride of ammonium. The former salt from its less solubility is deposited, separated and calcined to get the carbonate.—*Jour. de Pharms.*

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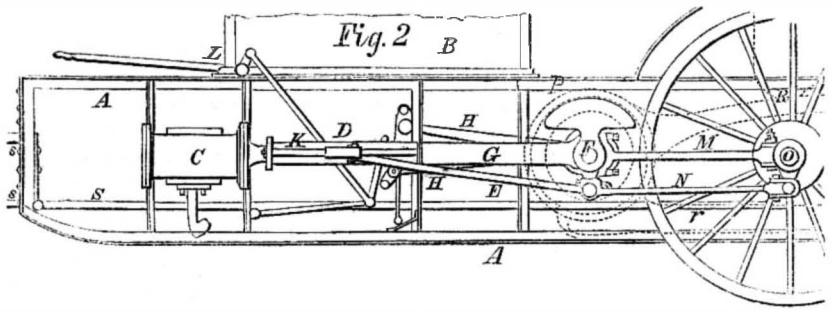
Grate area, 804 square inches; flue area, 214½ square inches. Total fire surface, 460 square feet. The boiler has been tested under a steam pressure of 200 pounds, and is safe under a much higher pressure; ordinary working pressure, 130 pounds.

The general arrangement of the machinery is that of a locomotive, with outside connections. The cylinders are of 7½ inches diameter and 14 inches stroke. The valves are operated by a stationary link and reversing lever, by means of which the steam may be cut off at any point in the stroke, giving the benefit of expansion in any desired degree, or may be instantaneously reversed.

The connecting rods from the engines act on cranks, placed, not as in locomotives upon the shaft of the driving-wheels, but upon an

Fig. 2

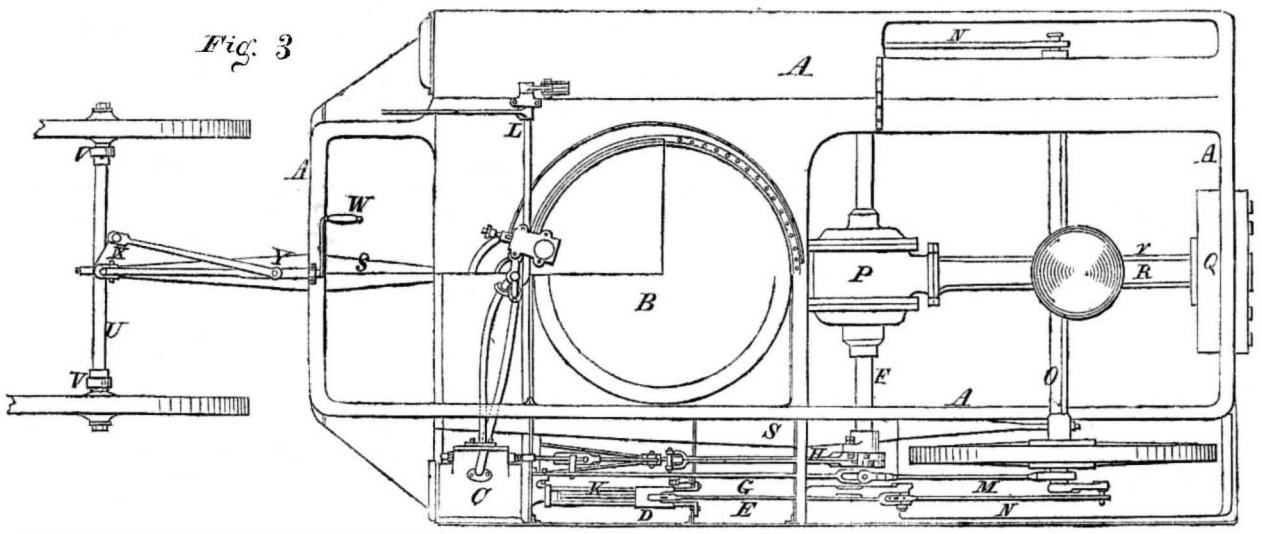


intermediate shaft, revolving in fixed bearings upon the frame, and operating the pump, which is one of Cary's Patent Rotary Force Pumps of the largest size. From this, the power is transmitted by a parallel rod to the driving wheels behind; the axle of which is kept at a uniform distance from the intermediate shaft by two strong arms, called radius rods, which take hold of each shaft near its ends. The moving parts of the engine are consequently undisturbed by the motion of the wheels, however rough the road may be, the power being accurately transmitted to them, whatever position they may take above or below the center line of the cylinders; while ball and socket joints, at the ends of the parallel and radius rods provide against any degree of side movement, twist, or flexure. When the engine reaches the fire, the parallel rods can be disconnected almost instantly, and the power then acts upon the pump alone.

In this important part of their apparatus, Messrs. Lee & Larned, it will be seen, have adopted substantially, with such modifications and additions as their special purpose required, the well-known steam carriage arrangement of Mr. J. K. Fisher, of which the intermediate shaft, radius, and parallel rods briefly described above are the principal elements. The screw steering apparatus is also a part of Mr. Fisher's arrangement. The use of the intermediate shaft to drive the rotary pump, with the instantaneous disconnection of the parallel rods, is a mechanical combination of very great merit.

The frame or bed, of boiler and angle iron, is hung upon four strong springs running lengthwise, and one cross spring under the hinder axle, not seen in the figures. The two front springs are placed one above the other in the line of the center of the carriage, taking hold of boxes upon the vertical steering spindle, T, by turning which, by means of the horizontal crank, X, operated by the screw sleeve, Y, and the winch, W, the direction of the axle is controlled, and the carriage steered with great facility and precision. In these

Fig. 3



connections, as on those with the hinder axle, ball joints are provided to secure flexibility.

The total weight is about five and a half tuns. The length of the frame or body is is about 14½ feet, its breadth 7 feet, and the total length of carriage 20½ feet. Fuel enough for two hours consumption can be carried in the space back of the hinder axle. Steam can be raised to working pressure in from six to ten minutes; but it is intended that steam shall be kept up at all times, so that the engine can start at a moment's warning. As the boiler is very thoroughly clothed, and the loss of heat by radiation very small, this can be done at a moderate expense compared with that of supporting a horse-establishment for hauling the engine.

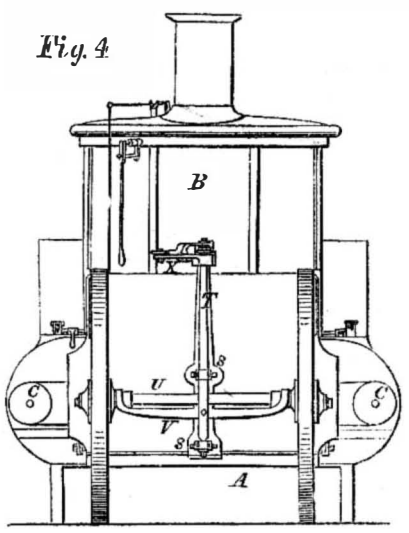
The pump discharges 4 6 gallons per revolution, and may be run with good effect at any speed, from 50 revolutions to 250.

At the trial on the 5th instant, before Street Commissioner Cooper and other officials, it threw from 700 to 750 gallons per minute through a 1⅝ inch nozzle, a horizontal distance of 252 feet, and a perpendicular hight estimated at not less than 160 feet; also two 1⅛ inch streams about the same hight and distance. The hose was then taken to the top of a five-story building, 60 feet high, and a 1⅝ inch stream thrown 150 feet horizontally, and an estimated additional hight of 80 feet. From the same position, playing through an open butt of 2½ inches diameter, water was thrown at the rate of about 900 gallons per minute, over two intervening roofs, with great force and effect, upon the roof of the third building beyond, a distance of 60 feet.

After the trial, it ran, with fifteen men on board, over some of the steepest grades and worst conditioned streets in the city, to the entire satisfaction of the Street Commissioner, who rode on the engine and selected the route.

At the trial in the Park, on the 18th inst., it threw a 1⅝ inch stream 267 feet, a two inch stream 232 feet, and a two and a half inch stream through an open butt the astonishing distance of 196 feet; the

Fig. 4



pump making 240 revolutions and discharging 1,100 gallons of water per minute, and the boiler supplying abundance of steam at this speed, with a pressure of 150 pounds to the inch. This performance is believed to be unprecedented in the history of hydraulic machinery of a portable kind, whether for steam fire-engine purposes or any other.

Further information may be obtained from Messrs. Lee & Larned, 52 John street, New York, room No. 7.

Fagan's Improved Pump.

An interesting book might be written on pumps, if the line of thought pursued were the ingenuity of man as displayed in his endeavors to raise water by these means. There is no difficulty in the aqueous world with which inventors have not coped, and in the majority of instance have proved successful, and a specimen of such success forms the subject of our illustration, which is a novel pump invented by J. L. Fagan, of Anaqua, Texas, and on which he has applied for a patent.

Fig. 1 is a view of the pump, the lower part being shown in section. A is a hollow cylinder attached to a tubular shaft, B. The cylinder, A, is secured in a circular step, C, attached to a bed-piece, D, placed in the well. The shaft, B, has its bearing in a crosspiece, *a*, and the upper end of the shaft fits in a hollow stationary cap, E, having a nozzle, F. The cylinder, A, communicates with B by two curved pipes, *c d*, each provided with a valve, *e*, opening into B. Within A a flanch or piston, G, is secured, (this is better seen in Fig. 2, which is an horizontal section through A,) and extends inwards toward the vertical shaft, H, that is secured to the bed-piece, D, and is fitted loosely in the top of the cylinder. To the shaft, H, a radial plate, I, is fixed and which extends to the inner surface of A. The plate, I, and piston, G, divide the cylinder into compartments, *f* and *g*, and each compartment has an aperture, *h*, provided with a valve, *i*, operating inwards. The tubes, *c d*, communicate each with a separate compartment, *f g*. On the upper part of the shaft, B, are placed two bevel wheels, *h′ h′*, into which a corresponding wheel, *i′*, on a horizontal shaft, J, gears. To the shaft, B, two pawls, K K, are attached, which are made to catch alternately into their respective wheels, *h′* and are alternately released from them by means of springs, *j j*, and inclined plates, *k k*. The springs, *j*, being attached to shaft, B, and the inclined planes to the framing that supports the working parts; horizontal pins, *l*, are also attached to the framing. The pawls, K, bear against the smooth surfaces of the bevel wheels, *h′*, notches, *m*, being made in them into which the pawls catch at the proper time.

Fig. 1

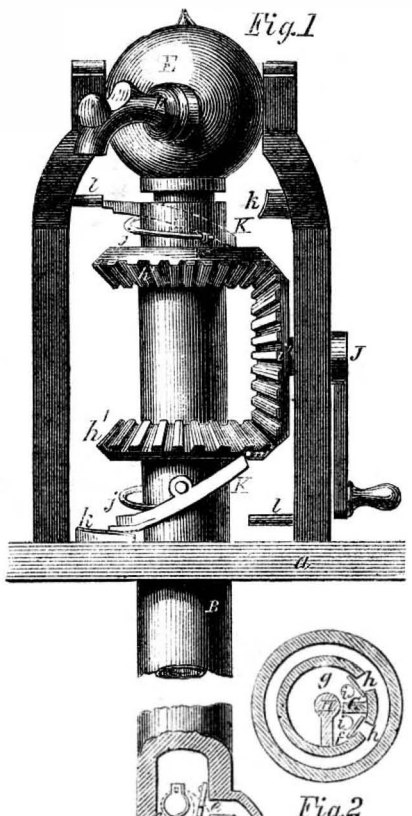
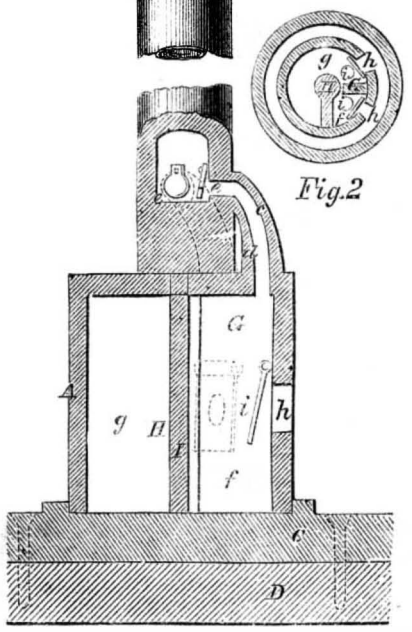


Fig. 2



The operation is as follows:—Power is applied to the shaft, J, in any proper manner, and a reciprocating partially rotating movement is given the cylinder, A, through the medium of the gearing, *h′ i′*, and ratchets, K K, the ratchets being made to catch alternately into the notches, *m*, of their respective wheels, by means of the springs, *j*, and elevated therefrom by the inclined plates, *k k*, the pins, *l*, preventing the pawls from dropping into the notches during the return movement of the wheels, *h′*, when the notches pass under the pawls. The piston, G, forces the water alternately from the chambers, *f g*, through their respective tubes, *c d*, into the shaft, B, from whence it is discharged through the nozzle, F. The valves, *h*, close by the pressure of the water under the action of the piston, G. In this pump there are but few parts, and they simply arranged; it is not liable to get out of order, and is a very efficient submerged pump.

Any further information will be given by the inventor upon being addressed as above.

Death of Madame Ida Pfeiffer.—This lady died in Vienna on the 27th of October, of an illness contracted during her late visit to Madagascar. Her travels and adventures have been made familiar to the reading public by many interesting volumes.

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Scientific American.

NEW YORK, NOVEMBER 27, 1858.

The Pursuit of Knowledge.

It is a pleasant sight to see the earnest seeker-after-truth opening the book or periodical, and gleaning, in an eclectic spirit, all the good therefrom. To the contemplative mind it speaks of greatness yet to come—of progress yet to be achieved—of glorious results which shall follow in the wake of the truth-seeker's thought. But in this hurry of daily life—this skirmish of business—this whirlpool of excitement—this world of work—how many persons are there who have time to wade through the mighty folio, or even the thick octavo, for a single fact, or to read the mass of information that has been printed on any one subject, in order to obtain a little bit of knowledge? Not many. Without some other supply than these, the mechanic thirsty after information on machinery, the farmer anxious for knowledge on agriculture, the inventor wishing to know all about the most recent inventions, the manufacturer looking out for novelties in his special branch of trade, the housekeeper wanting practical receipts, must remain unsatisfied, neglected, and forgotten—unheard of by the *savant*, unknown by the college. Indeed, were the spread of knowledge left to these, the people would obtain but little information, for all their proceedings are couched in phrases unknown to the multitude, and the scientific men of all the world express their living thoughts in a dead tongue—the Latin. It is lucky, therefore, for those classes of persons, and, in fact, for all, that there are other means of obtaining reliable, practical, and pleasant information, divested of the technicalities of the schools of learning, and cheap in the extreme. In the SCIENTIFIC AMERICAN will be found all the discoveries of the year, plenty of receipts, the List of Patents issued, with their claims, and extended notes of prominent inventions, illustrations of machinery, and novelties in every branch of art, science, or manufacture; in fact, each weekly number is the condensed epitome of all the good and useful truths that have been made known in all parts of the world during that space of time. We endeavor, with our foreign and home exchanges, with new books, and scientific societies' proceedings, and with our extensive correspondence, to exercise an eclecticism, condensing and putting into our own columns all the real practical information they contain, and thus not only economizing the time of the reader, but giving him a paper which can, with advantage to himself and others, be read all through. By carefully pursuing this system, and from the undisputed accuracy of all our statements and opinions concerning patents and inventions, aided by possessing an office at Washington, from which we receive reliable information, the SCIENTIFIC AMERICAN has become a positive necessity to every inventor. Each number being so valuable, then, they should be carefully kept by our subscribers that they may be bound, as the volume forms a mass of facts of all kinds not to be found in any other publication this side the Atlantic. Indeed, in looking through the last volume ourselves, even *we* have been surprised and astonished to find the varied and useful mass of matter and information it contains. The power of the press is mighty, even for evil, how much more should it be for good? and we are glad to say that although there are too many who read the paltry story papers—the ephemera of the press—there are, at the same time, many thousands from Maine to Florida—from the Atlantic's shore to the Pacific's beach—who look for each week's SCIENTIFIC AMERICAN with an anxiety only equaled by the pleasure with which they hail the day of rest. We feel that we are doing for this country a great work. We also feel that we do not do all we might. And why? Because, for some unknown causes, there are too many who do not subscribe for this journal. We rely on our present subscribers to aid us to do more good, by extending in their own districts and neighborhoods our subscription list. You can do it easily if you will, and the reward, in the knowledge that you have done good, is greater by far than the labor expended.

Alphonse de Lamartine, the great French *litterateur*, called his readers his best friends, and said, "Who should I ask to aid me in selling my books but them?" And he was right; for they, having derived pleasure from him, owe him something more than the ten francs paid for the book. How much greater should be the debt when information is the article given, and that for two dollars a year? We do not ask any return from our readers, except that as they feel they have been benefited by the knowledge they have gained from our columns, so they will endeavor to spread that knowledge by gaining for us a more extended subscription list. The truest republic is that of information, and we labor weekly to make its home in this, the Western World. Our reward is small; we only ask that the SCIENTIFIC AMERICAN shall be in the hands of all who are in pursuit of knowledge. We do all we can to place it there by advertising and similar means, but we want more still—the helping word and hand of our good friends. Reader, will you help us? The work is nothing, the return great; for there is a glorious satisfaction, a truly pleasurable emotion in doing good, which every one may feel by extending the number of readers of the SCIENTIFIC AMERICAN.

Machinery Oil.

The best oil for diminishing friction in delicate machinery, such as clockwork, should contain no acid or mucilage, and should be capable of enduring intense cold without congealing, it should in short be pure olein, without any trace of stearine. All fixed oils contain stearine and olein; the former must be removed to obtain the latter. This is done by treating the oil with seven times its weight of alcohol, almost boiling hot, then decanting the liquid. The stearine separates on cooling in the form of a crystalline precipitate; the alcohol is afterwards evaporated, and olein remains clear as pure olive oil, and congeals with great difficulty. Of course, this method of treating oil is too expensive for the purposes of common machinery. Common oil, and even the sperm, is liable to oxydize and attack both iron and brass work on which it may be employed for lubricating purposes, especially when exposed to a high heat.

We have seen some parts of a valve chest belonging to a steam engine cut away where the grease found access—tallow being the lubricating agent—while those parts exposed to the same heat of the steam, but untouched by the grease, were perfectly sound. We attributed this result to the acid in the grease acting on the metal chemically to disintegrate it. By treating oil or molten tallow with an ounce of sal-soda and the same quantity of quick lime to two gallons of oil or tallow, stirring them for about half an hour and maintaining them at a temperature of about 212°, much of the acid will be separated and fall to the bottom, while the clear left on the top will be excellent for brass and iron machinery. If oil be cooled with ice to render it somewhat thick, and then placed in bags and expressed, the stearine will be separated and the clear oil pressed out, will be found superior for lubrication during cold weather. The oil which is derived from expressed tallow in candle manufactories, and which is commonly employed for making soap is superior to unrefined tallow for lubricating machinery.

We understand that pure sperm oil is still held to be superior to all others for lubricating common machinery, but as it is the dearest, many of the cheaper oils are now employed for such purposes and among the rest coal oil. Great quantities of these are now made for machine lubrication, and at the Kerosene Works, near Bushwick, L. I., oil for similar purposes is also manufactured from pitch obtained from the celebrated pitch lake in the island of Trinidad, described on page 29, volume XI., SCIENTIFIC AMERICAN.

Useful Effects of Light.

Sir James Wylie, late physician to the Emperor of Russia, attentively studied the effects of light as a curative agent in the hospitals of St. Petersburg; and he discovered that the number of patients who were cured in rooms properly lighted was four times greater than that of those confined in dark rooms. This led to a complete reform in lighting the hospitals of Russia, and with the most beneficial results. In all cities visited by the cholera, it was universally found that the greatest number of deaths took place in narrow streets, and on the sides of those having a northern exposure, where the salutary beams of the sun were excluded. The inhabitants of the southern slopes of mountains are better developed and more healthy than those who live on the northern sides; while those who dwell in secluded valleys are generally subject to peculiar diseases and deformities of person. These different results are due to the agency of light, without a full supply of which plants and animals maintain but a sickly and feeble existence. Eminent physicians have observed that partially deformed children have been restored by exposure to the sun and the open air. As scrofula is most prevalent among the children of the poor, this is attributed by many persons to their living in dark and confined houses; such diseases being most common among those residing in underground tenements.

The health statistics of all civilized countries have improved greatly during the past century. This may be justly regarded as due to the superior construction of houses, by admitting more light into them. The old-fashioned dwellings were built with narrow dwarfish windows; and as glass, until within recent years, was very dear, its application to windows was proportionably limited. Dwelling-houses of the present day are generally built with windows of four times the dimensions of those belonging to the olden times; and the streets of our cities—upon which houses depend so much for their light—are made much wider than those of a past age. Light is now more valued, for its influence is better understood than was the case fifty years ago; and the most gratifying results have followed. But we are not at the end of city improvements yet; as it is felt, in almost all our cities, that if the streets (even the broadest of them) were twice their present width, a general benefit would be the result.

Examining a Human Heart.

About two years since our city was visited by Alexis St. Martin, of Canada, who has an opening in his abdomen, (the result of a gun shot wound,) through which his stomach can be examined, and the operations of digestion observed. His case has hitherto been considered the most wonderful in the world, but one more wonderful than that of St. Martin is now here. During the past week, M. Groax, a native of Hamburg, exhibited himself to the faculty, in the University Medical College, this city, and lectured on the heart and its actions, and exhibited his own beating heart in the same manner that St. Martin did his stomach. This case however is a natural phenomenon, Mr. Groax having been born with a slit in his breast, by which his heart and a part of his lungs can be observed. At the solicitation of European physicians he is traveling over the world exhibiting himself to the attention of the medical men of various countries.

American Union of Inventors.

This organization has taken spacious premises at 620 Broadway, New York, where they intend to hold a Fair, commencing December 6th. This society is chiefly formed of exhibitors at the late Fair, so disastrously terminated by the destruction of the Crystal Palace. They want the inventors of the country to give them their support by sending models, machines, &c., for competition, and they assure them that every care shall be taken of the products of their ingenuity. Steam power will be provided in abundance, and for safety the boilers are placed outside. Every precaution has been taken against fire, by steam pumps, with hose attached, being distributed throughout the building. We wish the projectors success. The building is now open for the reception of goods; and inventors should address John L. Riker, Director, 620 Broadway.

The Sleeping Cars.

A clergyman from Kansas, who recently visited Baltimore, thus describes the newly-invented sleeping cars that are now on the railroad that crosses the Alleghanies:—

"Detained in the Monumental City for a day beyond my contemplated stay, by the indisposition of a traveling companion, I employ an hour of rest in addressing you from a direction opposite to that from which your readers are wont to hear from me.

"Improvement marks every year, among our enterprising Eastern people visible to the eye of an annual Western visitor. If the Atlantic Telegraph is a failure, the sleeping cars are not, as many a weary traveler can attest. Who would have thought, a year since, of going to bed at Johnstown, and waking up in the neighborhood of Hollidaysburg? Fifty cents will now sleep a passenger over the Alleghanies in horizontal posture upon a comfortable bed, without once being aroused by the punch of a conductor, and the annoying 'show your ticket, sir?' Next to the 'man who first invented sleep,' and upon whose head blessings were invoked by honest Sancho Panza—next to him, the gratitude of the traveling public is certainly due to the originator of this flying dormitory."

Professor Silliman and the Atlantic Cable.

During a lecture delivered by Professor Silliman, in the Cooper Institute, this city, on the evening of the 16th inst., he gave it as his opinion that "the difficulty experienced in working the Atlantic cable was owing to some defects caused by its exposure to the great heat of the sun, while it lay coiled last year in the factory at Greenwich." The opinion of the learned professor has been very extensively circulated, but no proof has ever been adduced to establish its correctness. The cable before it was laid was tested, and found in perfect order. It may answer, however, as the opinion of a *savant*, since no amount of scientific investigation can ascertain whether or not it is true.

Sorghum Sirups.

A prodigious number of saccharometers for testing the strength of sirups have been made and sold in this city during the present autumn. Their purchasers, as we have been informed, were mostly western farmers who obtained them for testing sirups made from Sorghum cane. From this we infer that the new sugar plant was extensively cultivated during the past season, and that the sirup made from it will take the place, in a great measure, of common molasses, among our rural population.

The new arsenal that has been building at the corner of Thirty-fifth street and Seventh avenue, in this city, and which was nearly completed, fell in on the morning of the 19th inst., severely injuring several persons who were in the vicinity. The roof was of novel and peculiar construction, and we had had a diagram prepared, illustrating its peculiarities, but we refrain from publishing it until we have received from the architects a full account of the cause of the accident.

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Retardation of Signals through the Atlantic Cable.

MESSRS. EDITORS—In a recent number of the SCIENTIFIC AMERICAN, one of your correspondents says, "No advantage would be secured by having, as some have proposed, a separate wire to complete the circuit." I think the contrary can be shown to be the case.

To make my meaning clear, we must look a moment at the cause of the retardation of signals, owing to secondary currents. It is now pretty well understood that it is as follows: the inner, or conducting wire, is in the position of the inner coating of a Leyden jar, the outside iron wires and water forming the outer coating, and the gutta percha representing the glass separating them. When a galvanic current or wave is sent through the inner wire, besides passing through it to the other end, it also charges it in the same manner as a Leyden jar, forming a secondary current, which tries to get to the earth wherever there is a chance; and the time occupied in doing this is the first obstacle experienced. Now, after the wire is so charged, when the circuit is opened at the transmitting office, this secondary current cannot get out at that end, on account of having there no communication with the earth, consequently it proceeds to the receiving office, where the wire is connected with the earth to receive the signals, and there finds its way to the earth, and while flowing out, it affects the instruments at that office after the signal has been received.

If now, instead of the circuit being kept open by the transmitting operator, he wishes to send another signal immediately after the first, and before the secondary current has got out at the other end (which occupies some time), and he closes the circuit for that purpose, thereby connecting the conducting wire with the earth, part of the secondary current remaining in the wire immediately rushes back to the earth by that route, as it can, in that way, reach it sooner than by going to the other end. This, of course, interferes with the wave the transmitting operator is trying to send, as it cannot enter till the secondary current has passed out.

By considering these things carefully, we find that the only interruption we meet with from the secondary current is when any communication is made between the conducting wire and the earth, which, of course, in the present system of working, is done whenever a signal is sent or received. Therefore the only way to avoid that interruption is to keep the conducting wire perfectly insulated at all times from the earth and outside wires of the cable, and this I propose to do as follows:—

Have two cables of one wire each, or one cable of two wires. Let one wire be employed to carry the current across, and one to bring it back, thus doing away with all ground connections. All instruments and batteries placed in this circuit must be perfectly insulated from everything else. The handle of the key used in transmitting signals must be made of glass, or some non-conductor; likewise the connection between the adjusting handle and instrument, if it be a rod; or of silk, if it is a cord.

With cable and instruments thus insulated, it is plain that when the first current is sent through, either one of the following things will occur; the wire will not become charged with the secondary current at all, on account of its having no communication with the earth to obtain it from, or, if it does become charged, it will not discharge itself, on account of there being no route or conductor to convey it to the ground. The conducting wire, then, being always charged with this secondary current, the battery current would require no extra time to charge it, and would pass at once to its destination—being neither lengthened at the other end by the secondary current following it out, or resisted at its entrance the second time by the same current rushing back to the earth.

With reference to the two inside conducting wires inducing currents in each other, on account of running parallel, the induced currents will have no effect on the primary ones, as they would run in the same direction and with less force, and I should think, would be entirely destroyed by the battery current.

I submit this idea to the consideration of those more experienced in cables than I am, as, though it is only an idea which I have no chance of testing by experiment, still, everything should be tried which would render such an important undertaking successful.

G. S.

Montreal, C. E., November, 1858.

Iron Girders.

MESSRS. EDITORS—In the issue for November 6th, and others, of your valuable journal, I read with much interest the articles headed as above, and was not a little surprised at the new theory there advanced, as I had always considered Hodgkinson and Fairbairn unquestionable authority in such matters. The following quotation, however, would throw a doubt on the result of their experiments:—"The pressure of a load on the upper side of a beam must extend downward through its entire depth, producing vertical pressure on every possible horizontal line or plane within its depth, equal to the weight of the load, and finally result in the pressures on the bearings under its ends. This simple statement, so obviously true, ought to be sufficient to dispose of the absurd notion of a neutral axis." Only that to insure its truthfulness, the beam, unlike all other beams, must on no account be permitted to attempt any deflection from the strain of the load, because when it does, the top flange *will* suffer from compression, and the lower one from tension, gradually diminishing in intensity as they approach each other, the point where the two are expended must necessarily be free from strains, and therefore *is* correctly called the neutral axis. The parallel rib and flanged girder alluded to is well known by engineers not to be in strict accordance with the theoretical requirements of strength, but as a general thing, the convenience of the shape for all building purposes, and the facility afforded in the manufacture, especially if of wrought iron, is a sufficient apology for the excess of material.

The mode recommended by your correspondent to convince the doubting of his theory, by dividing "a beam horizontally in two parts, in any line where they suppose the neutral axis to be situated. Then if they will place their hands between the upper and lower parts thus divided, they will become *painfully* impressed with a conviction that the supposed neutral line is not free from pressure." Certainly a very novel way of appealing to their senses, only there is one little difficulty to be overcome before it could be done. The dividing a beam as recommended, would, unfortunately, produce two beams, with two compressing and two extending surfaces, and in putting their hands between the two, they might, perhaps, get them hurt. It is however, hardly likely that the admirers of Hodgkinson and Fairbairn could be induced to submit to such a test. M.

Baltimore, Md., November, 1858.

Salt as a Fertilizer.

A correspondent writing to us from Kanawha, Va., where the Salt Springs are located, requests some information regarding common salt as a fertilizing agent. He says in reference to it, "that it is no doubt a valuable agent when properly applied, and were the facts generally known, they would be prized by a large class of your readers."

Plants, like human beings, require for their sustenance and growth a certain amount of the constituents of common salt, and these must be furnished from the soil, in order to be taken up by the roots. If the soil in any district contains a sufficient supply of these substances, of course the addition of more salt would be of no avail. Fields along the sea coast generally receive a sufficient quantity of salt from the rain clouds which carry saline matter, and deposit it near the source whence they originate; the lighter rains being free from saline matter are carried to a greater hight and wafted far inland. In localities remote from the sea, salt applied in moderate quantities to the soil is generally beneficial. Agricultural chemists, however, are not fully agreed as to the soils for which salt is most applicable, only that all soils should contain a certain amount of the constituents of salt, for the healthy growth of plants, such as about five hundred pounds to every acre, taken at a depth of six inches. To determine the amount of salt in the soil, the following will be found sufficiently accurate for all common purposes. Take half a pound of dry soil, and wash it with two pints of cold distilled water, then filter it through paper. Now, take a weak solution of nitrate of silver, and pour it into the filtered liquid. If there is salt in it, a white precipitate will be thrown down, which will acquire a purple color on exposure to the light. Dry this precipitate in an oven, and in every ten grains of it there will be four of common salt. If half a pound of dry soil yield one grain of salt it will contain 500 pounds in every acre, six inches deep. On inland meadow lands, especially those which are somewhat old, salt supplied as a top dressing, at the rate of fifty pounds to the acre has been found very beneficial. All farm yard manures contain considerable quantities of common salt, and where these are applied as a top dressing, salt is not generally required. Heavy saline rains from the Atlantic do not generally reach beyond the Appalachian chain of mountains, therefore common salt as a fertilizing agent, we think, may be used with advantage on all lands west of these elevations until we come to the Rocky Mountains.

Purifying Coal Gas.

In manufacturing gas from bituminous coal, sulphureted hydrogen also passes over from the retorts, and this must be removed to render the illuminating gas fit for use. This has always been a difficult and expensive part of the process, but it is so no longer. A very remarkable patent case, in which this question was at issue, was recently tried before Baron Bramwell and a special jury, at Guildford, England. The plaintiff was P. C. Hills; the defendants, the London Gas Light Company. Hills obtained a patent in 1849, for the use of the hydrated oxyd of iron in separating sulphured hydrogen from the gas, also for renovating the oxyd of iron after it had become saturated with sulphur, so that it can be used for the same purpose repeatedly. The defendants admitted the use of this material for purifying their gas, but contended it was not the invention of Hills, but of A. Laming, who had secured a patent in 1847 for effecting the same object. The jury, however, gave a verdict for Hills, it having appeared to them that it was an hydros, not hydros oxyd, which Laming described in his patent.

We direct attention to this subject principally to suggest to all the gas companies in our country, who use coal containing sulphur that they employ hydrated oxyd of iron as an effectual and cheap purifying agent. The way to prepare it is to dissolve the sulphate of iron (copperas) in hot water, mix it with the milk of lime, allow the precipitate to settle, pour off the clean liquor, and expose the precipitate to the air for a few days. By such exposure it becomes an oxyd, and in a moist state is employed either by itself or mixed with the sulphate of lime. The gas to be purified is passed over the oxyd in a close vessel, either before or after it has been passed through the lime purifyer on its way to the reservoir. This hydrated oxyd will only absorb a certain quantity of sulphur, after which it must be exposed to the atmosphere for some days, or else heated in a furnace until it becomes red hot. This action drives off the sulphureted hydrogen from it, and it can then be re-employed for the same purpose.

** PERSONS who write to us, expecting replies through this column, and those who may desire to make contributions to it of brief interesting facts, must always observe the strict rule, viz., to furnish their names, otherwise we cannot place confidence in their communications.

H. C. G., of Philadelphia.—Common indelible ink—made by dissolving nitrate of silver in a minute quantity of ammonia—may answer your purpose for writing on porcelain labels for flowers and plants. Keep it in a dark place or in a blue bottle when you are not using it. If this ink washes out by exposure to rain, try thin black paint.

A. P. L., of Ill.—Air is doubled in volume by a temperature of 491° Fah. A cubic inch of air heated to 300° expands to 1·610 cubic inches.

A YOUNG READER—The reason why rain water is soft, is because it is not impregnated with earth and minerals. It unites freely with soap and dissolves it, instead of decomposing it as hard water does. It is difficult to wash your hands in hard water, because the soda of the soap unites with the sulphuric acid of the hard water, and the oil of the soap with the lime, and floats in flakes on the top of the water.

L. P. S., of Conn.—The helices of magneto-electric machines are made separate from one another.

R. C. D., of Pa., inquires why it is that flame will not pass through the very fine wire gauze used in miner's lamps? Answer: Simply because the metal wire is a very rapid conductor of heat, and when the flame of gas burning in the lamp reaches the wire gauze so much heat is conducted away by the wire that the flame is extinguished.

L. W. B., of Conn.—Your new method of laying out a race course so as to equalize the distance to be run by the horses, would not be the subject matter of a patent; in other words, it is not an invention within the meaning of the statute.

P. M. E., of N. C.—Sharp's rifles will answer for sporting purposes. We thank you for the high opinion you express of this journal. You are one of its oldest patrons.

G. O. E., of New Orleans.—Address F. H. Smith, of Baltimore, Md., upon the subject of brick-making.

J. M. C., of Ohio.—The idea of wrapping the conducting wires of submarine cables around a core of gutta percha is good, no doubt, but you have been anticipated.

J. M. W., of N. Y.—"Dick's Practical Astronomer" will give you such information as you ask in reference to small telescopes.

G. M., Jr., of N. Y.—Your project of making a water light is chimerical. You cannot decompose water in a glass lamp by the action of its flame upon a wire passing down into the liquid.

J. E. B., of Cal.—We have entered your name for one year's subscription. We have no confidence in fish-catching recipes. We consider them mere traps to catch human gulls in.

W. S., of Ohio.—We do not call to mind any decision of the United States Courts in reference to the validity of B. F. Palmer's artificial leg patent. Your drain tile machine seems to be new. You had better send us a sketch and description of it. The subject of draining land will acquire, we think, additional interest every year, and it deserves attention. Experiments are now in progress on some of our southern plantations, where draining is almost a necessity. The earth needs air as well as moisture, and the drain tile assists in this very essentially.

H. H. S., of Ga.—The reason why sap ascends through the tubes of a plant, is because of capillary attraction, assisted by light and heat, and when these lose their power, the juices again descend by the same tubes. It is legal to tender for debts all gold coins at their respective values for any amount; the half dollar, quarter, dime, and half dime for debts of any amount under five dollars; three cent pieces for debts of any amount under thirty cents.

E. G., of Washington City.—The art of drawing is coeval with civilization itself. Oil painting was, however, invented by Van Eyck, a Flemish painter, in 1415. The first oil painting ever made is now in the Cathedral of Ghent, in Belgium; the subject is "The ascension of the saints to heaven." From that time pictures executed by these new processes were in such request from foreign countries that the painters of that country could not execute them fast enough. The art was also extensively practised in Italy in the 15th century.

B. A., of Ohio.—We have carefully examined the sketch and description of your alleged improvement in harvesters, and advise you not to apply for a patent. You will find substantially the same thing illustrated and described in Volume X, page 184, of the SCI. AM. This volume contains a valuable history of this class of inventions. In reference to engravings, we prefer to have our artists prepare them when intended for our paper. We should probably charge less for them than you would have to pay in your place, and they would be superior in quality; besides this, we would publish them in the SCI. AM. free of charge.

CASTING HEAVY GUNS—On page 60, present volume of the SCI. AM., in an item on this subject, we stated that a gun recently tried at Castle Island, near Boston, was made by Messrs. Aller & Co.; we should have said Alger & Co. We might also add that the one tried was selected from thirty others by the officer appointed by the Bureau of Ordnance at Washington, and there is every reason to believe the other twenty-nine are just as strong and good.

J. W. R., of ——.—The blades of the propeller in the Winans' steamship are not fastened to a water tight drum, but on a central shaft, the water having free ac-

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cess all around and about them. Of course she must require less power to propel than to upset, or else she will turn round like a porpoise at play. As you say however, the tendency of the propeller will always be to roll her over, but this could be easily prevented by having two propellers revolving in opposite directions. We are given to understand that her first trip is to be to New York. If she arrives here, we shall assuredly go and see her, and then we will be able to give a more decided opinion of her merits or demerits.

FIEST IRON PATENT.—Lord Edward Dudley seems to have been the first successful patentee in connection with the iron manufacture in England. The gradual exhaustion of the supply of wood from the forests led naturally to the substitution of some other fuel than charcoal. In 1612, King James I. granted a patent to one Simon Sturtevant for making iron with pit coal. He was compelled by the king to publish his discoveries, which he did in a book called his "Metallica." His invention was a failure, and he surrendered it the following year. In respect to Lord Dudley's patent, although he was able to make only about three tuns per week, yet in the celebrated act abolishing the grant of monopolies, his patent was exempted although it met with much opposition.

LETTER WRITING.—We are in the habit of considering ourselves the greatest reading and writing people in the world; we are certainly not the latter, for while every person in the United States sends but 4·9 letters per annum (upon an average of ten years) by mail, the inhabitants of Great Britain send 17 letters each per annum. This is accounted for in some measure by the superior delivery arrangements in large cities, the rate being only two cents, delivery included, all over the kingdom.

J. P. A., of N. Y.—You can obtain black lead crucibles of Joseph Dixon, Jersey City, N. J.

A. T., of Pa.—Use copal varnish for japanning your tin, and dry thoroughly in an oven heated to 180°, and you will be successful. The reason why your japan is so easily scratched with the finger nail is owing to its not being sufficiently dry, or perhaps you have used too much turpentine in it. Varnishes may be colored with any of the pigments used in oil painting.

H. D. T., of N. Y.—To "case harden" iron, make a paste with the prussiate of potash and a little water; apply it to the surface of the article, allow it to dry, then insert it in a clear fire until it assumes a low red color, when it should be taken out and dipt in cold water. This process converts the surface of iron into steel. Iron is burnished with a polished steel tool called a "burnisher," which is rubbed hard over its surface. The file marks on the article must be previously removed with emery. Etching, not engraving, is executed on steel and copper plates with dilute nitric acid. The outlines of pictures only are thus traceed to assist the engraver.

O. M., of Erie, Pa.—The common rule for calculating the horse power of a steam engine is to multiply together the area of the piston in inches, the number of pounds pressure of steam per inch in the boiler, minus four pounds deducted for friction of engine, and the velocity of the piston in feet per minute, and divide the product by 33,000, which is the number of pounds a horse is capable of raising one foot per minute. The ower of your engine thus calculated would be 78¼ (inches, area of piston) multiplied by 46 (pounds pressure of steam) multiplied by 320 (speed of piston in feet per minute) divided by 33 000, equal 34¾ horses power. It is proper, however, to state that, owing to the difference of pressure in the boiler and cylinder, this is a very unsatisfactory calculation, though the best that can be made without an indicator, which is an instrument for taking the pressure of the steam in the cylinder throughout the stroke. The average of the pressure thus found being used in a similar calculation to that above given in the same way as the boiler pressure, gives the most correct estimate of the power of an engine that can be obtained by any other means than a dynamometer. The proportion of grate surface commonly employed in small boilers is about a square foot per horse power, and a square yard of flue surface. In boilers of large power a less proportion of grate surface is used.

J. A. H., of Md.—To remove dried plaster from glass, use warm soap suds.

O. O. B., of Ill.—We cannot advise you to make any such desperate attempt to procure a patent on an invention of doubtful novelty as to risk all your hard earnings on the result, and unless you can find some one to advance the funds, you had better defer the matter.

C. G., of Tenn.—For information about a bolt and rivet machine address Bassett & Bateman, of Cincinnati, Ohio. We believe they have a good invention for this purpose.

Money received att he Scientific American Office on account of Patent Office business, for the week ending Saturday, November 20, 1858:—

W. M., of Md., $30; G. W. P., of L. I., $30; C. A. B., of N. Y., $20; W. Y. G., of Ky., $10; N. D., of N. J., $15; N. W., of Wis., $10; L. F. M., of N. Y., $30; H. M., of Ky., $30; J. D. F., of Ala., $30; R. B., of N. Y., $25; T. H. M., of La., $25; G. W. F., of Mass., $37; D. W., of Mass., $25; J. C., of L. I., $30; J. Y., of Pa., $25; B. B., of Md., $30; H. Z. & Co., of Ohio, $55; J. L. W., of N. Y., $25; J. M., of L. I., $30; S. E. T., of N. J., $37; W. W. L., of Ohio, $250; G. S., of N. H., $30; J. T., of Ohio, $25; R. G., of Md., $107; C. & F., of Me., $30; G. G., of Ill., $55; J. F., of Pa., $30; H. F. W., of Ill., $30; E. O'C., of N. Y., $30; O. S., of N. Y., $50.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Nov. 0, 1858:—

T. H. M., of La.; T. R. Van G., of Pa.; T. T., of Ohio; C. A. B., of N. Y.; J. Y., of Pa.; H. B. T., of Wis.; G. W. F., of Mass.; N. D., of N. J.; R. G., of Md.; A. K., of N. Y.; O. S., of N. Y. (two cases); G S., of Ill.; J. L. W., of N. Y.; T. & M., of N. J.

Literary Notices.

THE BOOK OF MORMON. Translated by Joseph Smith, Jr. New York: J. O. Wright & Co., 377 Broadway. This is a new American edition of this most remarkable work, perhaps, from its astounding effects, the greatest literary curiosity of the age. The introduction gives all the arguments, *pro* and *con*, for its authenticity, and as a matter of history as representing the grandest delusion of the nineteeth century, it is certainly worth a perusual by all. We, of course, do not recommend the deductions which are made from it, but simply think it is worth a reading from the astounding moral phenomena of which it has been the cause.

BERTRAM NOEL. A Story for Youth, by E. J. May. New York: D. Appleton & Co., Broadway. This is a pleasant story and well told, and the principal character and hero of the tale is a good model for the youth of both sexes. The characters are well drawn, and if there be the slightest fault to find, it is that it terminates too abruptly, and there is not enough of it.

THE EDINBURGH REVIEW—L. Scott & Co., 79 Fulton street, New York.—The Octobor number of this fine old magazine contains a number of able reviews, the one on "Gladstone's Homer and the Homeric Age" being a chef d'œuvre of classical criticism.

THE WESTMINSTER REVIEW—L. Scott & Co., 79 Fulton street, New York.—The current number has a splendid article on "Indian Heroes," and another on "F. Newman, and his Ecclesiastical Critics," in which the orthodoxy of English theological schools is completely demolished.

ILLUSTRATED ANNUAL REGISTER OF RURAL AFFAIRS FOR 1859. 144 Engravings. Price 25 cents. T. Tucker & Son, Albany, N. Y. This valuable farmers' almanac is full of useful information and pleasant facts, good advice on moral subjects, and plenty of valuable knowledge. Every agriculturist should have one.

HALL'S JOURNAL OF HEALTH. No. 3 Everett House, New York. This popular journal still keeps up its interest, and the practical medical advice which its columns contain recommend it to every one as one of the most entertainingly useful periodicals published.

A WORD TO OUR PATRONS.

RECEIPTS—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona fide* acknowledgment of the receipt of their funds. The Post Office law does not allow publishers to enclose receipts in the paper.

BACK NUMBERS.—It has been our custom in years past to send the back numbers of our paper to all who subscribe during the first quarter of the volume. This system has given satisfaction heretofore, and we shall continue it on this volume, unless the party subscribing orders to the contrary when he remits. Those who do no not care for the back numbers, to render their volumes complete, can have their subscriptions commence at the time of remitting by signifying such a desire.

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Yours, very truly, CHAS. MASON.

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Dated 10th November, 1858.
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Science and Art.

Notes on the Progress of the Paddle and Screw.—No. 2.

It appears that Denis Papin, in 1690, first proposed to use steam to work paddle-wheels. A rack-work was moved by pistons descending in steam cylinders by atmospheric pressure. Savery, in 1702, scarcely ventured with timidity to suggest the use of his steam engine for the purpose, but it is asserted in a French work that Papin, in 1707, actually propelled a vessel on the Fulda by Savery's engine.

The first patent relating to a steamboat is that of Jonathan Hulls, in 1736. He placed a paddle-wheel on beams projecting over the stern, and it was turned by an atmospheric steam engine, acting in conjunction with a counterpoise weight, upon a system of ropes and grooved wheels.

The Comte d'Auxiron and M. Perrier are stated to have used a paddle-wheel steamboat in 1774, but the notices of these and of other early experiments are very vague, not contemporaneous, or on doubtful authority. Desblancs, in 1782, sent a model to the Conservatoire (still there) of a vessel in which an endless chain of floats is turned by a horizontal steam engine.

The first notice I can find of a successful trial of the steamboat recorded by witnesses, is in a notarial certificate, which I lately inspected in Paris. This asserts that in July, 1783, the Comte de Jouffroy caused a vessel of 130 feet in length to be propelled for a quarter of an hour by a steam engine upon the Saone, near Lyons.

Experiments conducted about the same time, at Dalswinton, in Scotland, by Patrick Miller, resulted, in 1787, in the successful use of a steam engine, by Miller, Taylor, and Symington, to propel a vessel by paddle wheels, which worked one before the other in the center of the boat. The engine of this, the first practical steam vessel, is still preserved by Mr. Bennet Woodcroft, Superintendent of Specifications at the Great Seal Patent Office, and it may now be seen at the Patent Museum in Kensington.

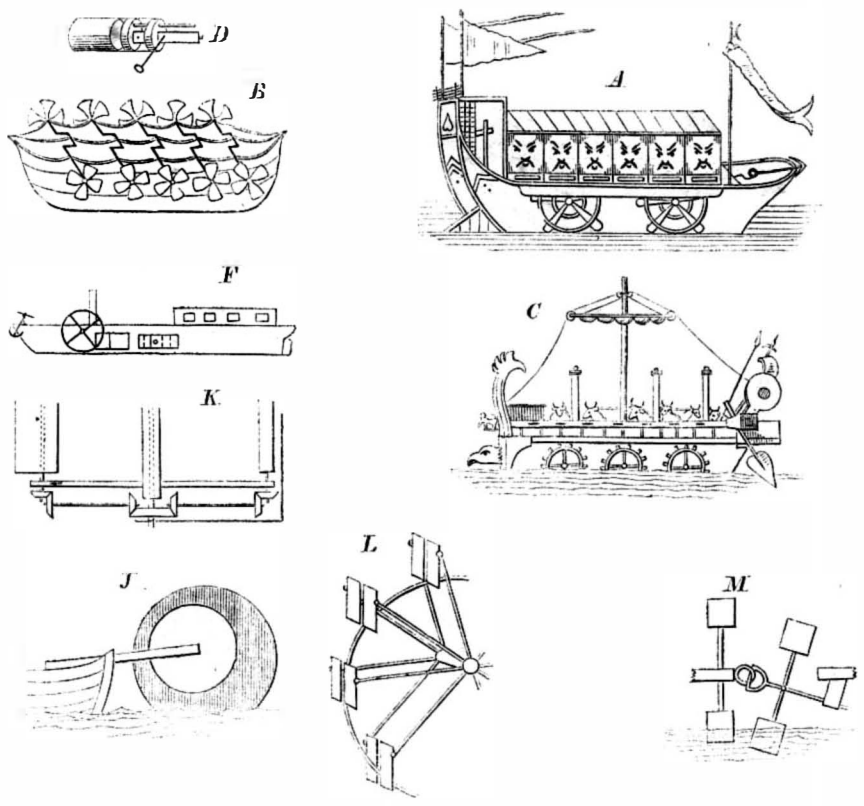
The *Charlotte Dundas* was built on the Clyde canal in 1801. Although Fulton used a steamer on the Seine in 1803 and another in America, the *Clermont*, in 1807, was the first that plied so as to be remunerative in that country. In 1809, the *Fulton the First*, steam-frigate, was launched at New York. Bell built the *Comet* in 1811, at Glasgow, and used it regularly for traffic next year. In 1815, Dr. Dodd steamed from Glasgow by Dublin to London in the *Thames*, which made a stormy passage of 758 nautical miles in 121 hours.

Steam navigation was introduced into France in 1815. In 1818, Napier's steam-packets ran regularly between Greenock and Belfast. It is said that, in 1819, the *Savannah* steamed from New York to Liverpool, but the assertion is very questionable. The *Comet* first carried the Admiralty pennant in 1822. In 1825, the *Enterprise* steamed from England to Calcutta in 113 days. Guns were first carried by the steamer *Salamander* in 1832.

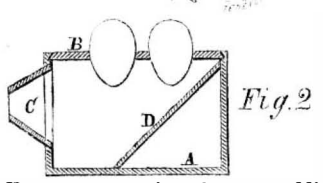
With respect to the various positions of paddle-wheels, it will be observed that most of those in earliest use were placed at each end of a shaft across the vessel. In Hull's plan (1736) the wheel was behind the stern; Bramah (1785), Miller (1787), and Symington (1801), placed the wheels in a passage inside the vessel open to the water. In Phillip's plan (1821) a wheel on deck turned on a vertical axis, and each float folded up to pass over the vessel. Submerged wheels on vertical axes were frequently patented. Sharples (1821) worked his wheel against the air; Harsleben (1826) placed the paddle shaft at an angle to the horizon; Robertson (1829) and Perkins (1829) kept it horizontal, but inclined to the line of the keel, and the floats being turned at an angle in the opposite direction, entered the water in the usual way. Sharpley (1856) substituted for the wheel and floats a drum carrying a spiral rib. Both these last two methods tend to propel the vessel in a line inclined to the shaft, and, in this respect, their operation is intermediate between those of the paddle-wheel and screw propeller. Bellford (1853) put the engine and cargo inside a hollow drum, with floats outside, that propelled it as the drum revolved.

In accordance with our promise we now present illustrations of some of the older forms of propellers, and from them, in a great measure, may be traced those in use to-day.

A. Chinese paddle-wheel war boat (600 years ago). Soldiers behind the tiger-head screens work the wheels within. B. Oldest drawing of a paddle-wheel boat—Valturius, 1472. C. Boat propelled by oxen turning paddle-wheels—ditto. D. The first marine steam engine—Papin, 1690. E. First patented steamboat—Hulls', 1736. F. First working steamboat—Comte de Jouffroy, 1783. G. The *Thames*, which steamed from London to Glasgow in 1815. H. Modern Chinese drawing of an English steamboat. I. Bellford's drum vessel, carrying the machinery and cargo inside. J. Congreve's mode of propelling by water rising in sponge round a wheel. K. Silvester's feathering floats (1729), worked by spindles and pinions. L. Lambert's feathering paddles (1819), kept vertical by a heavy ring. M. Galloway's additional paddle-wheel on an inclined jointed shaft.



The Oonoscope.



How many a time has a pudding been spoiled, and the milk of human kindness changed to vinegar by a bad egg! How often have we sat down to dinner, the lady of the house all smiles and pleasantry, until some dish came upon the table—the dish, perhaps, upon whose perfection she especially prided herself—and the first taste pronounced it unfit to eat, for the eggs were not fresh! What a study for a physiognomist to observe the hostess' face, then to see the clouds gathering on her forehead, the black looks at the domestics, and the general disagreeableness which replaced, with the suddeness of an avalanch, her former geniality. The meal is quickly brought to a close, the succeeding hours are miserably spent, everyone feels uncomfortable in the knowledge of a "scene" yet to come, and the unhappy matron has retired to her own room, most likely to indulge in that great balm for feminine griefs, "a good cry;" and all this misery and distress the result on an unsound egg! Had there been an "Oonoscope" in that household, no such uncomfortable event could have happened. "But what is an Oonoscope?" asks the anxious reader. We will explain. It is an entirely novel instrument for testing the quality of eggs, and consists of a small or large box, A, Fig. 1, which shows the method of using it, having a top, B, perforated with a number of holes, into which the eggs are placed, small end downwards. Two eye pieces, C, enable the observer to look into the box, and exclude all light, except that which comes through the eggs themselves. A mirror, D, seen in the section, Fig. 2, is placed at an angle in the box, and on to this the eggs are reflected by the light which passes through them, and they are seen on the mirror with all the imperfections or signs of decay which may be in the albumen or yelk. Each instrument is accompanied by a full description of their use, and the methods of detecting bad eggs.

These instruments are cheap and simple, and no household should be without either a large or small one, according to the number of eggs used in the family. They will save much annoyance and ill temper, and are much surer than the common hand test, by which the eggs are held up to the light in the hand, and it is often difficult to decide accurately on the quality.

Henry Burt, of Newark, N. J., is the inventor, and I. S. Clough, 231 Pearl street, New York, is agent in this city, either of whom may be addressed for further particulars.

New Method of Constructing Ships.

D. Vrooman, of Hudson, Ohio, has invented a novelty in ships, which enables the up-and-down motion, from the rolling of the sea, or other causes, to aid in propelling the vessel. The invention consists in forming projections on the bow, bilge, and counter of ships, whose sides shall be parallel with the keel, and whose upper and lower surfaces incline at corresponding angles at their rear terminations, and attaching to their wedge-shaped portions gutta percha, or other elastic fins or wings, in such a manner as to cause the water to impinge and act upon the inclined surfaces of the projections, and the yielding elastic fins during the upward and downward movement of the vessel through the rolling of the sea, and corresponding movement of the water, and thus propel the vessel in her course. The invention was patented this week, and the claim will be found on another page.

MECHANICS

INVENTORS, MILLWRIGHTS, FARMERS AND MANUFACTURERS.

FOURTEENTH YEAR!

PROSPECTUS OF THE

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